CLAIMS

What is claimed is:

1. A hex-axis horizontal movement dynamic simulator comprising three sets of movement control unit of the same structure located separately at the positions forming three sides of an equilateral triangle, and a load-carrying platform pivotally connected to the three movement control units by means of universal-joint yoke mechanism corresponding to each movement control unit; wherein each movement control unit comprises at least a set of universal-joint yoke mechanism, two connecting rods of fixed length, two sets of transmission-joint yoke mechanism and two sets of sliding seat for generating rectilinear translation motion to form a symmetric structure, one end of the two connecting rods are jointly pivoted to the universal-joint yoke mechanism to enable a spatial motion of 3 degrees of freedom relative to the load-carrying platform while the other end of the two connecting rods are symmetrically and separately pivoted to the corresponding transmission-joint yoke mechanism to enable a spatial motion of 2 degrees of freedom, and the transmission-joint yoke mechanism is pivoted to the corresponding sliding seat to enable 1 degree of freedom.

2. The hex-axis horizontal movement dynamic simulator as defined in claim 1, wherein each movement control unit comprises a set of universal-joint yoke mechanism, two connecting rods of fixed length, two sets of transmission- joint yoke mechanism, two sets of sliding seat, two lead screws, two sets of servo-driving mechanism and a set of rectilinear translation guide to form a symmetrical structure, one end of the two connecting rods are jointly pivoted to the universal-joint yoke mechanism to enable a spatial motion of 3 degrees of freedom relative to the load-carrying platform while the other end of the two connecting rods are symmetrically and separately pivoted to the corresponding transmission-joint yoke mechanism to enable a spatial motion of 2 degrees of freedom, and the transmission-joint yoke mechanism is pivoted to the corresponding sliding seat to enable 1 degree of freedom, the two lead screws pass through the two sliding seats and engage with the corresponding sliding seat with rotating angle and speed controlled by the servo-driving mechanism, the two sliding seats are mounted and capably sliding on the rectilinear translation guide; with this arrangement the rectilinear translation motion of the sliding seat on the corresponding rectilinear translation guide precisely controlled by the precise control of the rotating angle and speed of the corresponding sliding seat to enable a precise control of the spatial motion and linear and angular displacement of the load-carrying platform.

3. The hex-axis horizontal movement dynamic simulator as defined in claim 2, wherein the rectilinear translation guide comprises two straight sliding rails in parallel

fixed on a guide, and two guide seats each of which has two parallel guide slots on bottom side to match and ride on the two parallel straight sliding rails and slide along the direction of guide rails;

each servo-driving mechanism comprises at least a servo-motor which drives the corresponding lead screw and controls its rotating angle and speed;

each sliding seat is in the shape of a rectangular block having a pivoting recess on top side for pivotally mounting the corresponding transmission-joint yoke mechanism, and has its bottom side fastened to one of the guide seats, on the vertical surface of the sliding seat are two penetrating holes one of which has female screw thread, and engages with the corresponding lead screw while another hole serves as the passage for another lead screw to pass through;

each transmission-joint yoke mechanism comprises an upward yoke assembly and T shaped pivot axis which are pivotally assembled together with the yoke assembly, two horizontal stub shafts formed on and extend from the opposite side of the T shaped pivot axis and pivotally mounted on the two vertical portions of the upward yoke assembly and a perpendicular stub shaft extended from the center position for pivotally mounting one end of the corresponding connecting rod, and a mounting shaft is extended from the bottom side of the upward yoke assembly, and is pivotally mounted in the mounting recess of the corresponding sliding seat; and

the universal-joint yoke mechanism compressing a downward yoke, a cardan shaft, a neck-ring seat and cover plate in which two horizontal stub shafts are formed on, and extend oppositely from left and right side of the cardan shaft , and pivoted to the two vertical portions of the downward yoke, also two perpendicular stub shafts are formed on, and extend oppositely from the front and rear side of the cardan shaft which are separately and pivotally connected to the connecting rod; A mounting shaft formed on the top side of the downward yoke and pivotally mounted to the neck-ring seat, the bottom side of the cover pate is fastened to the upper side of the neck-ring seat while the top side of the cover plate is fastened to the aforesaid load-carrying platform.

4. The hex-axis horizontal movement dynamic simulator as defined in claim 3, wherein the structure of the sliding seat comprises at least a sliding block and a neck-ring seat, the bottom side of the sliding block is fastened to the guide seat of the rectilinear translation guide, which has two penetrating holes on the vertical surfaces, one of the holes has female screw thread which engages with the corresponding lead screw while another hole serves as passage for another lead screw to pass through, and the neck-ring seat is fastened to the top side of the sliding block with the mounting shaft of an upward yoke pivotally mounted in the mounting recess of the neck-ring seat.

5. The hex-axis horizontal movement dynamic simulator as defined in claim 4, wherein a fastening plate is fastened on the top side of the sliding block and the bottom side of the neck-ring seat is fastened to the top side of fastening plate.

6. A hex-axis horizontal movement dynamic simulator comprising three sets of movement control unit of the same structure located at the positions forming three sides of an equilateral triangle, and a load-carrying platform pivotally connected to the three movement control units by means of universal-joint yoke mechanism corresponding to each movement control unit, wherein each movement control unit comprises at least a machine bed, a set of universal-joint yoke mechanism, two connecting rods of fixed length, two sets of transmission-joint yoke mechanism, two sets of sliding seats two lead screws, two servo-driving mechanisms and a set of rectilinear transmission guide; wherein

the machine bed is a longitudinal stand having an inversed U shaped cross section with two cover plates fixed on both ends of the bed; the rectilinear transmission guide has two straight sliding rails parallel to each other and fastened on its top side and two guide seats having two parallel guide slots on the bottom side for matching the straight sliding rails and sliding in the direction of the straight rails;

each of servo-driving mechanisms is installed in the place near the end of the machine bed by a bearing plate to serves as the support of the two lead screws, the servo-driving mechanism also has a servo-motor installed inside the machine bed to construct a driving system with the corresponding lead screw to control the rotating angle and speed of the lead screw;

each sliding seat comprises at least a sliding block and a neck-ring seat, the bottom side of the sliding block is fastened on the guide seat of the rectilinear translation guide, and the sliding block has two penetrating holes on the vertical surface of which one holes has female screw thread for engaging with the corresponding lead screw while another hole serves as the passage for another lead screw to pass through, the neck-ring seat is fastened on the top side of the sliding block, and has a mounting recess in center position for pivotally installing the mounting shaft of the yoke of the transmission-joint yoke mechanism;

each transmission-joint yoke mechanism comprises an upward yoke and a T shaped pivot axis, the T shaped pivot axis has two horizontal stub shafts formed on, and extend from the opposite sides, and pivoted on the two vertical portions of the upward yoke, the T shaped pivot axis has a perpendicular stub shaft which is pivotally connected to one end of the corresponding connecting rod, a mounting shaft is formed on the bottom side of the upward yoke and is pivotally installed on the mounting recess of the corresponding sliding seat; and

the universal-joint yoke mechanism comprising a downward yoke, a cardan shaft, a

neck-ring seat and a cover plate, the cardan shaft has two horizontal stub shafts formed on and extend from the left and right side, which are pivoted on the two vertical portions of the downward yoke, also two perpendicular stub shafts are formed, and extend from the rear and front side and are pivotally and separately mounted on one of the aforesaid two connecting rods, the downward yoke has a mounting shaft on the top side which is pivotally installed on the neck-ring sent, and the cover plate has its bottom side fastened on the neck-ring seat, and top side fastened to the aforesaid load-carrying platform.

7. The hex-axis horizontal movement dynamic simulator as defined in claim 6 wherein a fixing plate is installed on the top side of the sliding block and the bottom side of the neck-ring is fixed on the top side of the said fixing plate.

8. The hex-axis horizontal movement dynamic simulator as defined in claim 6 wherein the sliding seat is in the shape of a rectangular block having a mounting recess on the top side which is for pivotally installing the corresponding transmission-joint yoke mechanism, and the bottom side of the sliding block is fastened on the two sliding guides of the rectilinear translation guide, the sliding block has two penetrating holes on its vertical surface of which one hole has female screw thread for engaging with the corresponding lead screw while another hole serves as the passage for another lead screw to pass through.

9. A hex-axis horizontal movement dynamic simulator comprising three sets of movement control unit of the same structure located in the positions forming three sides of an equilateral triangle and load carrying platform connected to the three sets of movement control unit by means of universal-joint yoke mechanism on each set of movement control unit; wherein each movement control unit comprises at least one set of universal-joint yoke mechanism, two connecting rods of fixed length, two sets of sliding yoke mechanism, two lead screws, two sets of servo-driving mechanism and a rectilinear translation guide; wherein the rectilinear translation guide has two straight sliding rails parallel to each other and two guide seats each of which has two parallel guide slots on the bottom side for matching the two straight sliding rails and sliding along the direction of the rail; wherein

each servo-driving mechanism comprises at least one servo-motor which constructs the driving system with the corresponding lead screw for driving and controlling the rotating angle and speed of the lead screw;

each sliding yoke mechanism comprises an upward yoke, a pivoting plate, a shaft, two fixing block, one L shaped sliding yoke plate, one sliding fastening plate and two cover plates; the L shaped sliding yoke plate has a horizontal portion and a vertical portion, a pivoting hole is formed on the vertical portion, and the bottom side of the horizontal portion is fastened on the guide seat of the rectilinear transmission guide,

the L shaped sliding yoke plate has two penetrating holes on the vertical portion, one of which has female screw thread for engaging with the corresponding lead screw while another hole serves as the passage for another lead screw to pass through; the L shape sliding yoke plate and the sliding fastening plate are assembled to form a set of L shaped yoke assembly, on the sliding fasting plate are two penetrating holes and a pivoting hole in the positions corresponding to the positions of the two penetrating holes and one pivoting hole on the L shaped sliding yoke plate, the two penetrating holes on the sliding fastening plate are the passages for the lead screws to pass through; the pivoting plate is in the shape of a rectangular plate with a pivoting recess on the center position and two horizontal stub shafts formed on and extend from two sides opposite to each other which are pivotally installed on the pivoting holes on the vertical portion of the L shaped sliding yoke plate and, the sliding fastening plate, and two cover plates are separately fastened on the vertical portion of the L shaped sliding yoke plate and the sliding fastening plate; the upward yoke has a mounting shaft on the bottom side which is pivotally installed on the pivoting recess in the center position of the pivoting plate, on the top side of the two vertical portions of the upward yoke are two semicircular recesses with which and the two fixing blocks having the same semicircular recesses fastened to the said two vertical portions, a shaft is pivotally mounted which is for mounting one end of the two connecting rods; and

the universal-joint yoke mechanism comprising a downward yoke, a pivoting plate, a shaft, two fixing blocks, a L shaped yoke plate, a fastening plate and two cover plates; the L shaped yoke plate has a horizontal portion and a vertical portion, the horizontal portion is fastened to the load-carrying platform, and vertical portion has a pivoting hole; the assembly of the L shaped yoke plate and fastening plate forms a downward yoke for mounting the stub shafts formed on and extended from the left and right side of the pivoting plate which is in the shape of a rectangular plate having a pivoting recess on center position, two cover plates are fastened on the vertical portion of L shaped yoke plate and the fastening plate to fix the whole assembly; the downward yoke has a mounting shaft which is pivotally installed on the pivoting recess in the center position of the pivoting plate which has semicircular recess on the bottom side of it two vertical portions for mounting a shaft by installing two fixing blocks having the same semicircular recess to the bottom side of the two vertical portions, and one end of each of the aforesaid two connecting rods are pivotally and separately mounted on both ends of the said shaft.